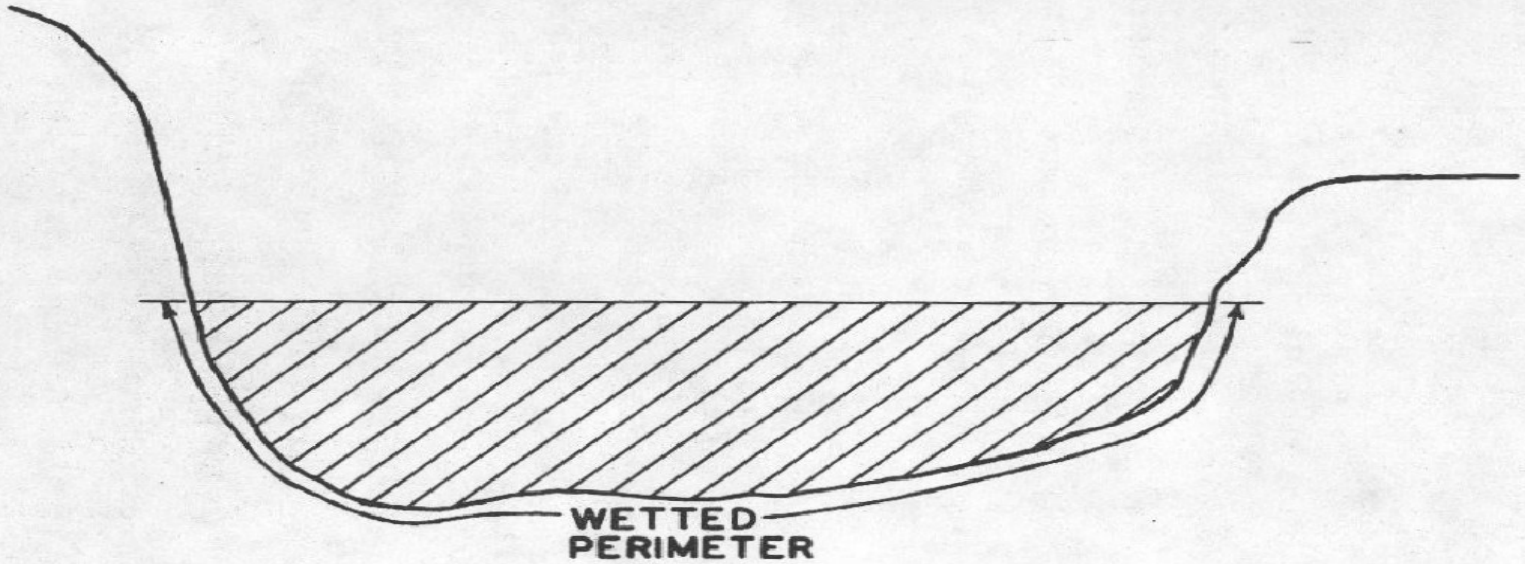
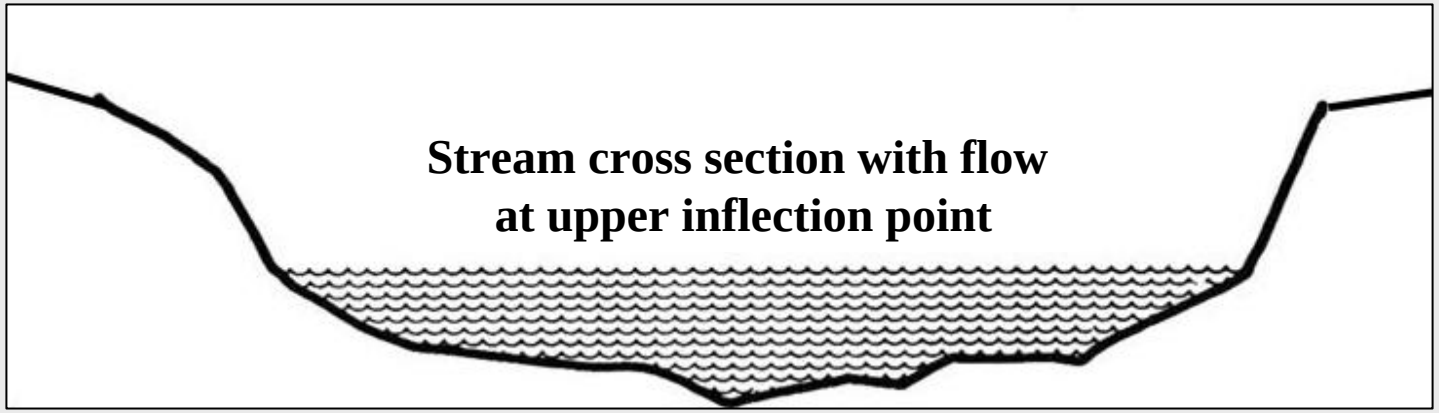
Montana's Wetted Perimeter Inflection Point Method

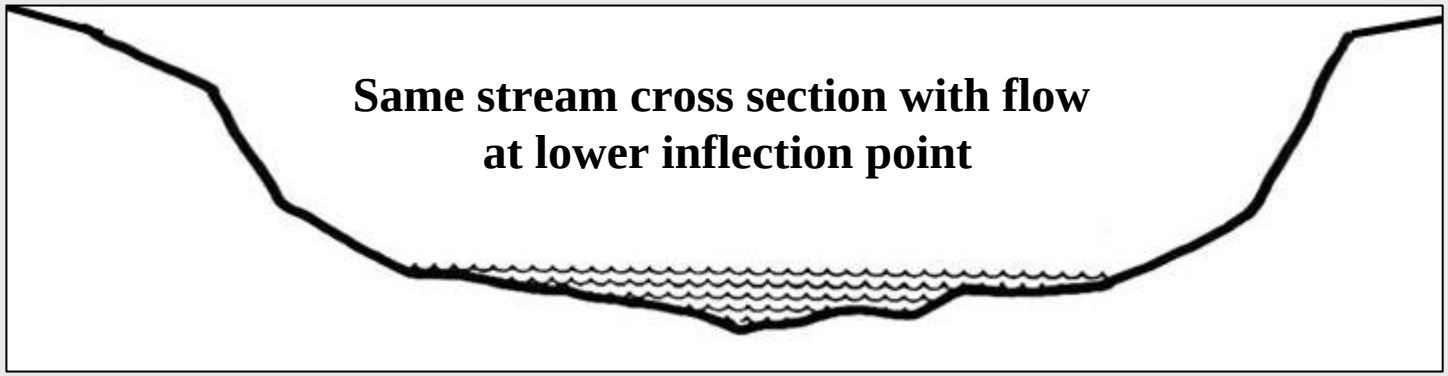
Excerpts from a 1986 Montana DFWP report
by Stephen A. Leathe and Frederick A. Nelson

“This method focuses on the assumption that the food supply can be a major factor influencing a stream’s carrying capacity during the non-winter months. The principal food of many of the juvenile and adult game fish … is aquatic invertebrates, which are produced primarily in stream riffle areas. The method assumes that the game fish *carrying capacity* is related to *food production*, which in turn is related to the amount of *wetted perimeter* in riffles.”

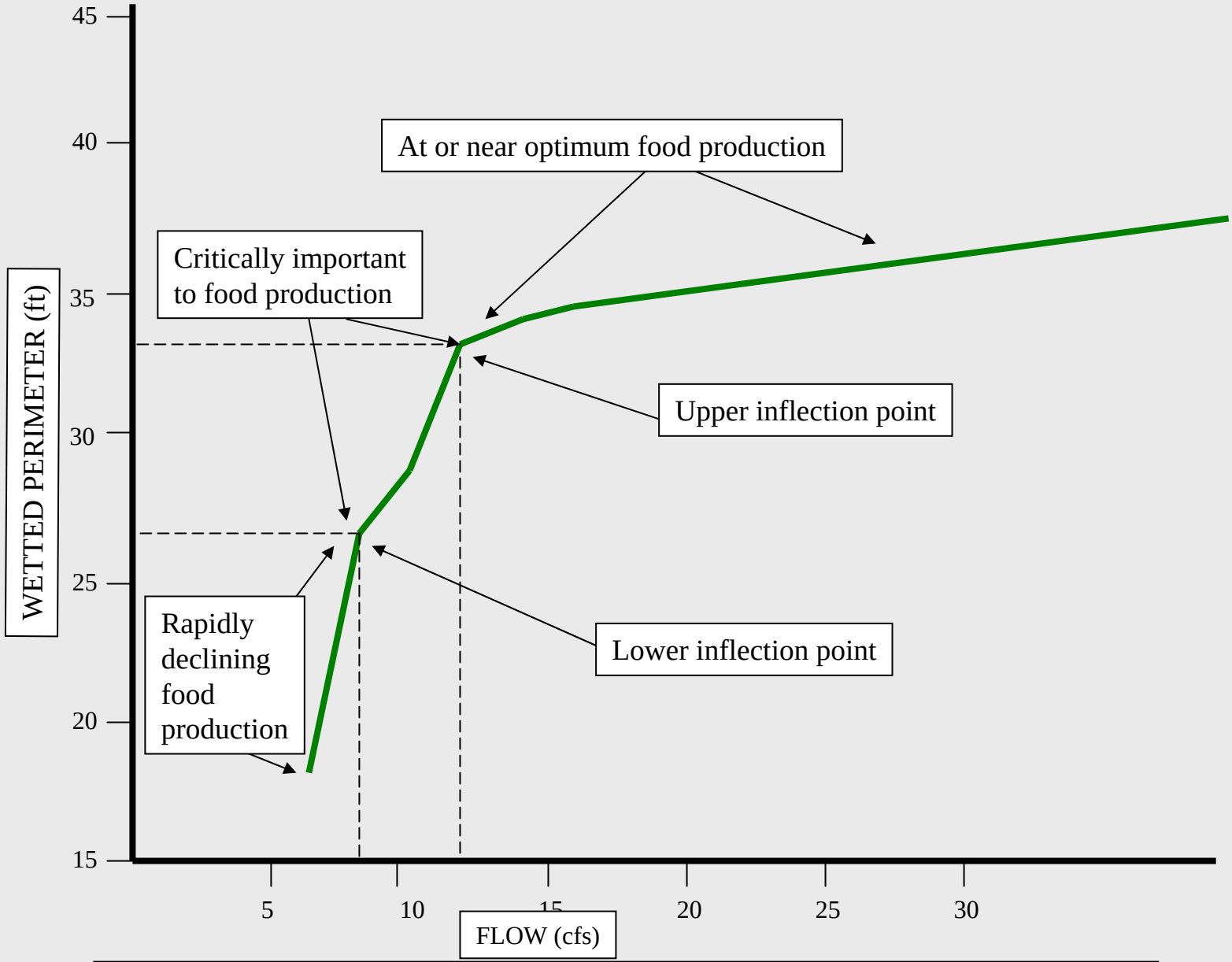


The wetted perimeter in a channel cross-section is the distance along the bottom and sides of a channel cross-section in contact with water.





“As the flow in a stream channel increases, the wetted perimeter also increases, but the rate of gain of wetted perimeter is not constant throughout the entire range of flows.”



An example of a relationship between wetted perimeter and flow for a stream riffle cross-section showing upper and lower inflection points

‘The upper and lower inflection points bracket those flows needed to maintain the high and low levels of habitat potential.

1. <u>High level of aquatic habitat potential</u>: that flow regime which will consistently produce abundant, healthy and thriving aquatic populations.

2. <u>Low level of aquatic habitat potential</u>: that flow regime which will provide for only a low population of the species present.’

‘While the inflection point concept focuses on food production, the wetted perimeter also relates to other factors such as bank cover, spawning, and rearing habitat.’

For the purposes of the Forest Service Compact, flows at the upper inflection point are needed to provide instream flow protection for those streams that have bull trout, westslope cutthroat trout, Yellowstone cutthroat trout, Columbia River redband trout, arctic grayling, or any other fish species listed in the future under the Endangered Species Act). See Article VI.B.1. of the Compact.